J. Waldburg

TERMS—Three Dollars per annum, payable in advance.

THE

SOUTHERN AGRICULTURIST,

FOR THE PROMOTION

OF

AGRICULTURE, HORTICULTURE, RURAL AND DOMESTIC ECONOMY

IN THE

SOUTHERN SECTION OF THE UNITED STATES.

NEW SERIES.—VOLUME VI.—NUMBER 3,

MARCH, 1846.

PUBLISHED BY A. E. MILLER;

No. 4 BROAD-STREET.

CHARLESTON:

PRINTED BY MILLER & BROWNE,

Old Stand, No. 4 Broad-street.

1846.

☞ WEIGHT 2 ounces—POSTAGE, 3½ cents.

CONTENTS:

The Southern Agriculturist.

(NEW SERIES.)

Vol. VI. FOR MARCH, 1846. No. 3.

From the Columbia South-Carolinian.

REPORT OF THE COMMITTEE ON DOMESTIC MANUFACTURES.

Presented to the Newberry South-Carolina Agricultural Society, at the annual meeting in July last.

The Committee on Domestic Manufactures, do not conceive that it was the intention of the Society that they should inquire into the grave questions of public policy, whether the industrious pursuits of the people of this State, should be converted from agriculture to that of manufactures, or, whether that branch of industry should be prohibited by burthens imposed by Government authority on all other pursuits for its benefit? but rather, that they should limit their inquiries to that species of manufacturing which can be done without the aid of any other machinery, than that wheel which is in common use on plantations, and for the most part, worked by hand power alone. Your Committee, therefore, have contented themselves by merely directing their inquiries to the making that species of domestic fabrics which are most suitable for clothing our slave population. The slaves of this District alone, may be set down at eleven thousand. The cost of clothing a grown hand, (exclusive of shoes, hats, and blankets,) at present prices, from the best information your Committee could obtain, will not fall short of $4 50 per annum, and for those under that class, (or not hands) half that sum. In this estimate, each hand is allowed two shirts and two pair of pantaloons in the spring; and one shirt, one pair of pantaloons and a coat in the fall. The spring clothing to consist of cotton alone—the fall clothing, (except the shirt) of cotton and wool;—say 15 yards of cotton and 7½ yards of cotton and wool, which is believed, will afford sufficient clothing for our climate. If we suppose that one half of our slave population are full hands, the cost of clothing at the above rate, will amount to the sum of twenty-four thousand seven hundred and fifsy dollars, ($24,750) for this District alone. Your Committee from the best information they could collect from experienced planters, are of opinion that a common female slave, after a short training, can produce at the rate of 4-5ths of a yard of cotton cloth per diem, or two-thirds of cotton and wool, throughout the year. If her services be rated at $72 00 per annum, (or 20 cts. per diem,) she would clothe one full hand in twenty-four days, which would cost 84 50, in labor; or to state it more concisely—one hand

will clothe thirteen workers. Your Committee are satisfied that *even on this supposition*, it would be found profitable for the cotton planters to have their slaves clothed with cloth manufactured on their plantations, and many reasons might be assigned in favor of this policy; but your Committee believe, that if there were no other than that of the superiority of the fabrics manufactured on the plantations, over those usually purchased, (in which opinion all the planters with whom they have had an opportunity of consulting agree,) should of itself be sufficient to induce the universal adoption of this method of clothing our slaves. But it is not the practice, nor is it necessary on most plantations to set apart a separate hand for that purpose. Generally, on plantations, there are pretty nearly an equal number of male and female hands, and about the same number of small negroes, so that some of the women are necessarily retained in the house to take care of the children, and to be relieved from the hard services of the field, who can be profitably employed in spinning and weaving, to the great benefit of themselves and the children under their charge, when at the same time, they furnish clothing to the other negroes. There are also, certain seasons of the year, when the male hands can do all the work necessary on the farm. The women can then be employed in making cloth for the plantation, without any disadvantage to the plantation, unless the overseer may wish to put it in *showing condition*, more for the sake of his own reputation, as an overseer, than for the profit of his employer. Thus, by the necessary attention of the overseer or owner, the requisite clothing can be furnished without any considerable diminution of the proceeds of the farm, and certainly not to the extent of the one thirteenth part of the nett income, which otherwise would be rquired.

It is believed by your Committee, that every planter can, with very little, (if any) expense, have the leather and shoes necessary for his slaves, made on his own plantation, which we are proud to find is now done by so many planters with entire success. The shoes thus manufactured, are considered to be far superior to those made for sale, which are too frequently made of refused leather, so that one pair of home made shoes, are thought to be equal to two pair of the other kind. The cost of shoes (if purchased) at one dollar a pair, and one pair to each grown hand, and also to one half of those under that size, will exceed the sum of eight thousand dollars, ($8,000) all of which must be taken from the nett proceeds of the cotton crop.

The blankets for our negroes must cost the planters of this District over twelve thousand dollars per annum, which your Committee believe from the information they have received from practical men, may be entirely saved by very little labor; and that too, by diminishing the amount of our great staple article, which now so heavily presses on the market from an over supply, by merely substituting what is usually (and not unappropriately) called "comforters," in place of a blanket. They are easily made by an ordinary

hand, by placing cotton (of a poor quality) between two cotton sheets, *(home made)* and stitching or tacking them together after the manner of making matrasses. It is said by those who have tried them, to be superior to the common woolen blankets.

Your Committee, therefore, respectfully recommend the planters to persevere in the practice of manufacturing every thing on their own plantations necessary for the use or comfort of their slaves, in the form of clothing, which we feel a pride in saying they have so vigoriously commenced. And if accompanied with rigid economy, they will be able to sustain themselves, unembarrassed, amidst the blighting drought which they are now enduring, to an extent unprecedented by the oldest and most experienced amongst us.

All of which is respectfully submitted,

SIMEON FAIR, *Chairman.*

From the South-Western Farmer.

MANUFACTURE OF COTTON-BAGGING, &c.

Natchez, Jan. 13, 1845.

Dear Sir:—I noticed in your paper the other day, an estimate made by Dr. Phillips, of the amount of cotton which might be consumed by the slave-holding States (ten) in mattresses, comforts, blankets, &c. To this estimate, I think it might do some good to add the probable quantity that could be consumed in cotton, cotton-bagging, rope, twine, and negro clothing. For instance:

To cover 5,000,000 bales of cotton, it would require an average of five yards per bale, of 45 inches wide, and weighing $1\frac{3}{4}$ lb. to the yard; the quantity of raw material would be 2 lbs. per yard, or 20,000,000 lbs.	20,000,000
To tie the same, 4 lbs. cotton rope per bale, or 5 lbs. raw material, - - - - - - - - -	10,000,000
To sew the same, $\frac{1}{4}$ lb. cotton twine per bale, say -	600,000
To clothe 2,147,000 negroes, 2 suits, average 5 yards, 4-4 domestic, to weigh $\frac{3}{4}$ lb., equal to 1 lb. raw material per yard, - - - - - - - - -	10,735,000
Pounds of cotton thus used, - -	41,335,000
300 lbs. to a bale—thus using bales, - - -	103,338
Add to this the estimate by Dr. Phillips, for mattresses, comforts, &c., - - - - - - - - -	146,515
Total bales, - - - -	249,853

To consume such a quantity of the raw material at home would most certainly have a favorable bearing on prices of this article in domestic and foreign markets. And this is not all that might be consumed at home, by a great deal, if the white male inhabitants of the Southern States would agree, as their sires did in old times, to wear the old-fashioned cottonade for pantaloons and janckets, and cotton-knit socks. * * * * *

Yours, truly,

N. G. NORTH, Esq. SAML. T. M'ALISTER.

Comparative cost of fabrics produced at "OUR" factory at Natchez, and those bought at the North and West.

In our paper, we noticed various articles fabricated at Mr. M'Alister's factory, Natchez, together with the dimensions, prices, &c. It is now our purpose to compare them with similar articles produced abroad; and even the blind must see that it is cheaper to support our own establishment. But to the figures:

	Per 100 yards.
Kentucky bagging costs 12½ cents per yard,	$12 50
" linsey, 35 cents per yard,	35 00
Lowells, 12½ cents per yard,	12 50
Sacking, 18 inches wide, 13 cents per yard,	13 00
Add difference between 18 and 45 inches wide,	19 50
Cost of Kentucky and Northern fabrics,	92 50
Cost of Natchez fabrics,	65 50
Saved to the planter,	$27 00

In a purchase of less than $100 worth in a matter of 400 yards of goods. In other words, a saving of 30 per cent. Any one can cipher it out for himself, as follows:

Cost of Nachez fabrics.

	Per 100 yards.
Cotton-bagging, 1¾ lb. to the yard, at 12½ cts. per yard,	$12 50
" 200 lbs. cotton, at 3 cents,	6 00
Linsey, 7-S, 4-4, at 12¼ cents per yard,	12 50
" 75 lbs. cotton, $2 25; wool, $6 25,	8 50
Lowell, 3-4, 4-4, at 6 cents per yard,	6 00
" 100 lbs. cotton, at 3 cents,	3 00
Sacking, 45 inches wide, double and twist thread, 12½ cents per yard,	12 50
Sacking, 150 lbs. cotton, at 3 cents,	4 50
Cost of Natchez fabrics,	$65 50

Equal to 30 per cent. saved. *Quod erat demonstrandum.*

The foregoing estimate, it will be seen, is made very large as to the cost of manufacturing at the Natchez establishment; for we have put down the cost of cotton at 3 cents per lb., whereas most of the fabrics, or at least many of them, can be made of trash or refuse cotton. The sacking made for Mr. Isaac Dunbar, for instance, of which we made mention, and of which a sample can be seen at Mr. Gibbs' store, was manufactured, as stated, out of "unmerchantable cotton." The cost of manufacturing bagging, too, is 10 cents at the Natchez factory; but we have put it down at 12½ cents, so as to be doubly sure of demonstrating to our friends that, by going to Natchez instead of Kentucky, Lowell, &c., they will save thirty cents on every dollar expended.

From the Boston Cultivator.

VINDICATION OF BOMMER'S METHOD.

Messrs. Editors:—Perceiving that the discussion of Bommer's method continued, is in a late number of the Cultivator, I take it for granted that in your opinion, the subject has not yet lost its interest, and that your readers would be willing to receive further light.

I am not sufficiently versed in the science of Geography, to readily understand from which part of the country your correspondent writes, concerning his unfortunate and ignorant neighbors, who have seldom, if ever, been in the habit of reading agricultural papers, and who by being formed into clubs, were induced not only to purchase the method at a very reduced price, but also to form manure heaps mountain high. If I should infer from the local name attached to his communication, that he is an inhabitant of some part of Florida, I should not evince more ignorance of his residence than he has displayed concerning the merits of Bommer's method.

It is true he admits that the sale of the method, may have induced farmers to save their manure, and to make compost to an extent which they never would have done, had it not been for the influence of the Bommer operation. Notwithstanding this important concession, he claims that Bommer's method was no more efficient in making manure, than was the Frenchman's recipe for killing bedbugs. Now I expect that sort of ridicule will pass for all it is worth, and with some readers may have more influence than the soundest arguments or the clearest testimonials from those whose position enables them to know of the things whereof they affirm. Hitherto I believe I have not occupied any place in your columns, excepting a mere advertisement, but having been courteously invited to communicate for the purpose of rectifying mistakes, or otherwise contributing to advance the cause of truth; I am satisfied that the time has fully come, that demands of me to communicate that intelligence which the public good requires, respecting the character, claims, and usefulness of Bommer's method. In attempting the vindication

of Bommer's method, Messrs. Editors, I ask no special favor to be awarded to me, except on this subject you should hereafter occupy neutral ground.

There are two important points on which the public need to be enlightened, respecting the claims of Bommer's method, viz:—The utility of the method, and the validity of the patent; respecting both of which I expect to be able to give the most satisfactory evidence. As your late correspondent Mr. W. Bacon, has spoken principally of the inutility of the method, I shall in this communication content myself with the refutation of his false insinuations, but in a subsequent article I shall endeavor to establish the validity of the patient.

It is sufficient for my purpose to prove by the most unquestionable testimonials that whenever the prescriptions of the method have been strictly followed that the most satisfactory results have been obtained. I am in possession of various important facts which cannot fail to deeply interest the public when they shall become duly presented. At this time I shall merely present you with a few testimonials from practical men who have demonstrated the utility of the method by actual experiment. By giving them an insertion in your valuable paper, you will subserve the cause of truth and the interest of agriculture. Respectfully yours, &c.

ELI BARNETT.

New Haven, Ct., Jan. 16. 1846.

UTILITY OF BOMMER'S METHOD TESTED BY PRACTICAL MEN.

Wishing to ascertain the value of Bommer's system, I was induced to try the process, although it was too late in the season to give it a fair trial, it being the last of November. My heap was composed of dry straw, potato vines, and muck. Immediately after my heap was completed, it came on very cold, and it was frozen to some depth, and I concluded that fermentation could not proceed to that degree necessary to produce decomposition until the heap should be re-constructed in the spring; but on opening it, I was much surprised to find it mostly decomposed, and apparently very strong. I have used a portion of it on my corn, and more fully to test its quality, I applied it to one half of a poor piece of land of a gravelly soil, and an equal quantity of hog and vault manure to the other half of the same piece.

The corn was all planted at the same time. The first of the season that part where the hog and vault manure were used, appeared to be making the greatest progress; but when I hoed it the second time, the half where the Bommer manure was used was one-third larger. I have watched it all through the season, and I now find, at the time of harvest, that I have at least one-third more corn from the patent manure than from the other. It was all of a foot higher, most of the ears were filled to the very tip, while on the other there were long snouts. And the effect was the same on my pumpkins and beans, they being increased in size and quantity at

least one-third. I would recommend to farmers by all means to make use of Bommer's method, and I have no doubt they will be pleased with the result of the process. I am so well pleased with my beautiful crop of corn, I have now made in my barn-yard a permanent vat, for the purpose of making large quantities of the manure.

WILLIAM MILLER.

Durham, Me., Sept. 1845.

Having examined a field of corn on the farm of Capt. Jacob P. Bettes, of Gorham, a part of which was planted with the Bommer manure, and a part with the best barn manure. The effect of the Bommer over the barn manure was very apparent, it being higher, more even, and in every particular, superior. We noted another very important effect, which must greatly enhance the value of the Bommer manure; that the worms did not injure it, while that part where the barn manure was used had the appearance of being much injured by that destructive insect. We also examined a heap of manure in the barn-yard, which, like that which was used on the corn-field, and made chiefly of turfs and had the smell and appearance of a very strong manure. Capt. Bettes informed us that the manure used on his corn was made in ten days, and we are satisfied from the information obtained, and the effect of the manure we have seen ourselves, that it will be a great acquisition to the farming interest.

JOHN H. PERLEY.
LEMUEL NASH, JR.

Gray, Me., Aug. 1845.

My success in manufacturing manure by Bommer's method, and its useful effects on my crops have far exceeded my expectations. Instead of doubting the economy of paying ten dollars for the right to use Bommer's method. I have no hesitation in saying, that I should consider one hundred dollars no temptation for me to be deprived of this valuable means of enriching the soil and of augmenting my crops.

SIMEON LERANTON.

Madison, Ct.

BOMMER'S MANURE.

The testimony which is presented in the annexed note, which we copy from the Boston Cultivator, accords with the experience of some of the best agriculturists of this State, and from our knowledge of the facts connected with the method, we have no hesitation in recommending it to those who will take the trouble to follow implicitly the directions given in the book.—*Ed. Am. Far.*

Messrs. Editors:—I have tested Bommer's patent method of making manure, and am satisfied that it is a valuable improvement. If the farmer will observe due regard to economy in his fixtures, and preparations for manufacturing manure on Bommer's plan, I

am convinced that he will find himself abundantly repaid for the outlay. Manure of the best quality, and of any quantity, may be cheaply and expeditiously manufactured by the process. Any farmer, who will purchase the method, and will faithfully use it, will be amply compensated for every expense; and no one, who will devote to it proper attention, is under any necessity of remaining destitute of that supply of manure which his wants require.

ALFRED HARGER.

Oxford, Ct., July 1, 1845.

From the American Agriculturist.

IMPROVED LAND.

Having succeeded beyond my most flattering expectations, through the aid of the Agriculturist and kindred journals, in subduing a piece of ground that was deemed almost unconquerable, I wish to give your readers a few very plain facts, which will show that sustaining agricultural journals is a profitable investment. I commenced tilling the soil on my hook, quite young, and practically knew but little about it; and though I have had my own ignorance and the prejudice of others to contend against, yet I have already hinted, and in the sequel will attempt to show, that I have accomplished something. I happen to know some farms where some of the best meadow land is a scar on the place; bogs, briars, and wet places abound, where at least two tons of good hay should be annually cut to the acre; and then produce as much pasture beside, in one season, as it would previously to any improvement. Now, I wish to attract particular attention to this fact, for it is indeed a *fact;* though I know some old fashioned farmers, who, if they were to meet with this, their mouths and eyes would expand with astonishment, and horror would be depicted on every furrow of their visages. First of all, let me say, that it needs a due share of energy and perseverance, qualities I hold essentially requisite to the accomplishment of any undertaking; but when a farmer especially is bound to persevere, it really seems astonishing what one can accomplish. But to my object. I am extravagantly fond of improving land; there is something peculiar about it that always interests me; it really seems like a certain way of improving one's self; and who is there that cannot appreciate it? Certainly, waving fields of grain are far more beautiful than acres of brush or stone.

I have a small plot of ground that once seemed graced with almost innumerable obstacles to successful cultivation; bogs and bog holes, hedges and briars; low places and high places, existed in all their native majesty; and it really seemed irreclaimable. But I have not found it so. The first step was to drain it thoroughly. And here just allow me very briefly to repeat my testimony in favor of draining. Previous to draining, the ground was so peculiarly situated,

every little shower the water would collect in little pools, causing, for the time being, a certain check to all our operations, thereby losing much time. Now, it bleeds at every pore, and we no longer fear to have it rain. To all our farmers I say, *drain* land that needs it, without delay. Standing water is death to all useful vegetation. *Draining does wonders.* After a thorough and complete draining, I could scarcely recognize the soil: the difference in the yield of grass was perfectly astonishing. Everything that could grow, seemed to enjoy and take advantage of its new liberties.

My next step in order was to cut and burn the bogs, and apply the ashes to a crop of corn, which proved more pleasant and profitable than crops of hassocks.

One fact I wish plainly understood. I plough my land *very deep*, much deeper than any of my neighbors. My average depth for ploughing is twelve inches; but the heavier the soil, and the more retentive the subsoil, the deeper would I plough. I particularize on this fact, because I have years of my own experience to support me, and because I have old-established farmers all around me, who are very much prejudiced against deep ploughing. Its advantages, in a few words, are, a deep soil for roots to penetrate for nourishment, and that the surplus water may pass through more rapidly. But a very safe criterion is a comparison between an ordinary farm and one where deep ploughing and good cultivation is constantly practiced; then mark the difference in the yield, aside from the general appearance of the farm. I always want those who are opposed to deep ploughing, to account for the enormous yield of vegetables and growth of trees in a garden where the soil has been trenched and manured to the depth of eighteen inches or two feet.

It is true, in my practice of deep ploughing, I often expose a poor subsoil, but to this I apply a double portion of manure. As I am of the opinion that manure for land is like oats for a horse—the best medicine you can give—and as the oats are applied inwardly, so I plough in my manure; as it seems to me the surest way of securing its benefits, or of "fixing the ammonia." I have seen farmers scatter loads and loads of coarse yard manure upon the surface of the ground, which practice I consider wasteful in the extreme, as almost every particle of any use is lost, as it is the *roots* we wish to supply with warmth and food, and not the *air*. I believe, however, we have yet much to learn in the application of manures.

Now, as to the economy of my practice, I will add that I am perfectly satisfied, and will give one proof in *dollars and cents*—as English writers say that it is the universal way of solving American problems. My crop of hay this dry season, I calculated paid the interest of $5 per acre, while along side of it, is land that scarcely yields enough to pay for fencing.

One more word as to manure. I am no chemist or scientific farmer, yet I believe in manure, and make it my constant practice to apply to the land every substance in the shape of manure, except

such decidedly acid substances as new tan, pomace, and the like. The higher portion of my ground I have converted into a nursery, and have now upon it a most beautiful, healthy, and thirfty growth of fruit trees. W. D.

Morristown, N. J., Nov. 1845.

AGRICULTURAL CHEMISTY.

BY PROF. JOHNSTON.

Why do old diary pastures especially require bones?

Because milk and cheese contain bone-earth, and if these be carried away and sold off the farm, the land is robbed by degrees of this bone-earth more than of any other substance. Only those grasses can then grow which require little bone-earth.

Every ten gallons of milk contain about half a pound of bone-earth. A cow, therefore, which gives twenty quarts a day, takes about two pounds of bone-earth from the soil every week. To return these two pounds to the soil, three pounds of bone-dust are required.

What kinds of animal dung are most commonly employed as manures?

Night-soil, horse dung, cow dung, sheep's dung, pigs' dung, and bird's dung.

Which of these is the most valuable?

In general, night-soil and bird's dung are the most valuable.

Why is night-soil so valuable?

Because men generally live upon a mixture of animal and vegetable food, which renders the dung richer.

Why is the solid part of horse dung richer or hotter than cow dung?

Because the horse voids little urine compared with the cow.

Why is cow dung colder and less liable to ferment than most other kinds of dung?

Because the large quantity of urine voided by the cow, carries off a great proportion of that which would otherwise cause it to ferment. [*Am. Agriculturist.*

A COMPOST FOR SANDY LAND.

Take 25 or 30 bushels of *lime*, (or double that quantity of *marl*,) and mix it with 25 loads of clay, let it stand for a few weeks, then haul it out, spread it on an *acre* of ground evenly—that done, spread thereon ten double cart loads of good strong stable or barn-yard manure, and plough the whole in, and your ground will produce better crops than if you had applied double or treble the quantity of stable or barn-yard mauure alone. [*Am. Farmer.*

From the Genesee Farmer.

MINERAL ELEMENTS OF PLANTS.

We make the following lengthened extracts from a late communication of Prof. Liebig to the first number of the "Agricultural Magazine," a work recently started in London, a copy of which was sent to the Editor of the Cultivator by Mr. Horsford. The readers of our paper for the last two years, will see in this article a confirmation of the importance of the principles which we have so often urged on the attention of farmers, to wit: that they must supply their crops with the *alkalies* potash and soda; and the *phosphates* of lime and magnesia, as well as gypsum and substances rich in ammonia, nitrogen or azote. It may be well to remark that the words azote and nitrogen mean the same thing, and that ammonia and hartshorn are compounds of azote and hydrogen.

Mr. Liebig attaches undue importance to the urine and dung of swine. He says: "If it were possible to provide our fields with the dung of swine in sufficient quantity, we would replace by it, in a soil which contains *silica* (flint sand,) and *lime*, all the remaining elements of plants—we have in it not only alkaline phosphates, the principal elements of seeds; but also alkaline carbonates, which are required by the leaves, stalks and roots. This purpose can not be attained by human excrements or guano alone, but perfectly so from stable manure from its containing alkaline carbonates."

Liebig seem to have entirely overlooked the material fact that the excretions of swine and all other animals necessarily varies according to the variation in their food. Thus, swine feeding in the same pasture with neat cattle and sheep, and eating the same grass, must certainly void the same minerals which the grass furnishes. It is absurd to suppose that 100 lbs. of clover will furnish a different set of elementary bodies in the dung and urine of the cow, the pig, the sheep, and the horse. Again it is equally unphilosophical to contend that the excretions of swine fed on hasty pudding and milk, will vary essentially from those of man living on similar food.

Nearly all the distinguished Chemists of Europe talk about stable and barn-yard manure as something of a uniform, homogenous character. The same mistaken idea runs through all their analyses of the dung and urine of different animals. As though a bushel of potatoes on passing through the alimentary canal of a cow, a horse, a sheep or a man, will furnish nothing but phosphate salts to one, carbonate salts to another, and something different from both to the third!

The following may be regarded as the essential constituent of a powerful manure applicable to all sorts of soils:

Earthy phosphates.—The most importaint of these is *phosphate of lime*, which occurs in nature as a mineral called *apatite*. It is the principal element in the bones, which, it may be observed, have been found most efficacious if calcined, consequently deprived of their animal matter. The rapidity of the effects of phosphate of

lime on the growth of plants, depends upon its greater or less solubility. Its amount of glue (gelatine) diminishes this solubility if the soil is rich in vegetable matters, which furnish carbonic acid by their decomposition, and which acid is required for rendering the phosphate of lime soluble in water and introducing it into the organism of the plants. In the calcined state, the bones act sufficiently quickly; but in those soils in which this cause of solubility is wanting, their action is slower. In my work I had recommended the addition of a certain quantity of sulphuric acid, both in order to render the bones more soluble and to change the neutral phosphate of the bones into gypsum, and into a phosphate which contains more acid (superphosphate of lime.) I have been informed that this advice has been most extensively adopted, that the superphosphate of lime has been found to be a most efficacious manure, and that it forms already a most important article of commerce. A second earthy phosphate, not less important, is the *phosphate of magnesia*, which it is well known enters in a still larger proportion than the *phosphate of lime* into the composition of the grain.

The *alkaline phosphates*, although not originally found in nature, are important elements of the seeds of grain, of peas, beans, &c. A rational farmer must provide them in sufficient quantities to those plants which require them for their development, from knowing that human excrements increase the produce in grain in a far greater proportion because they *contain* alkaline phosphates, than the animal excrements, in which they *do not exist.*

The *alkalies* (potash and soda) must be constituents of every rationally composed manure, because by them the original fertile condition of the field is preserved. A soil which contains the *alkalies* in too small a quantity, is perhaps, fertile for grain; but is not necessarily so for turnips or potatoes, which require a great quantity of alkali. By supplying an alkaline manure, fallows, or the cultivation of those plants which are grown during the time of fallowing, becomes less necessary.

Sulphate of potash is a constituent of all plants, although in small quantity, as well as *common salt* and *chloride of potassium* which are found in milk in rather a large proportion. The *salts of lime*, espepecially *gypsum*, are important nourishment for the leguminous plants. *Silica* is never wanting in all sorts of soils—it is a constituent of all rocks, by the decomposition of which all productive soils are formed, and the cerealia find it every where in sufficient quantity, and in a form capable of being taken up by the plants, *if the alkalies are provided* wherever they are present in too small quantity.

Salts of ammonia.—It can be regarded as certain, that the azote of the plants is derived, either from the ammonia of the atmosphere, or from the manure which is provided in the shape of animal fluid and solid excrements, and that azotic compounds exercise an effect on the growth of plants, only in so far as they give up their azote in the form ammonia during their decomposition and decay. We may,

therefore, profitably replace all the azotic substances with compounds of ammonia.

Decaying vegetable matters, which contain carbon, are useful to the fields in so far as they provide a source of carbonic acid; but they are not quite indispensable in manure, if the latter be rationally combined, as the atmospheric air is an inexhaustible source of carbonic acid from which the plants draw their carbon, if in the manure, the mineral substances are provided which are necessary for the assimilation of the carbonic acid. These are the substances which *together* give fertility to the soil; but although each of them may, under certain circumstances, (viz: where the soil is defective in it, or where it is not indifferent to the plant to take up one instead of the other, as, for instance, may be the case with soda instead of potash,) increase the fertility, no *one* of them can be regarded as manure, according to the common meaning of the word, for the simple reason, that only *all of them in certain proportions*, will fulfil the purpose for which the common manure is applied. This purpose is the restoration, or an increase of the original fertility, and by manure we must replace all the elements of the plants which have been taken away in harvest, or which are contained in the plants which we are desirous to cultivate.

What, then, are the constituent elements of the soil which we remove by the straw, seeds, tuberculous roots, stalks, &c., of our plants of culture? It is obvious that we must know these first, in order to *restore* them in sufficient quantities. To this we answer, by giving the analysis of the ashes of plants and their seeds. Hundred weights of the ashes of the following plants contain:

	Straw of			*Ashes of*	
	Beans.	Peas.	Potatoes.	Clover.	Hay.
Alkaline carbonates,	29.38	12.43	4.34	31.63	3.0
Carbonate of lime,	39.50	47.81	43.68	41.61	6.9
Phosphate of lime,	6.43	5.15	5.73	11.80	40.8
Phosphate of magnesia,	6.66	4.37	7.82	0.91	——
Sulphate of potash or soda,	12.40	10.15	——	2.23	8.84
Magnesia,	——	——	——	——	21.8
Chloride of Sodium or potassium,	0.28	4.63	2.8	2.27	3.06
Phosphate of iron, Phosphate of alumina, &c.	——	——	——	——	12.7

In these analysis *silica* has not been taken into account, as it is found in all soils, and need not be supplied. One hundred weight of the ashes of potatoes, and the seeds of the following plants, contain:

	Potatoes.	Wheat.	Beans (Vicia faba)
Alkaline phosphates,	15.75	52.98	68.59
Phosphate of lime and magnesia,	9.00	38.02	28.46
Phosphate of iron,	——	0.67	——
Sulphate of potash,	15.07	——	1.84
Carbonate of potash and soda,	51.70	——	——

What is wanting in the 100 of the above analyses is sand, coal, or loss. From these researches it appears, that for stalks and leaves we require other elements than for seeds. The former contain no alkaline phosphates, but they require for their development and growth a rich supply of alkaline carbonates and sulphates. On the other hand the carbonates are entirely wanting in the seeds; but the latter are very rich in phosphates. It is sufficiently obvious that a rational farmer must supply *both*, as well as all the others. If he supplies only phosphates, and does not restore the alkaline carbonates, his soil will become gradually barren—it will be exhausted in those necessary elements for the development of stalks and seeds, without which no formation of seed can be expected. If he supplies the alkalies, lime, and sulphates alone, in a given time he will get no more grain. All constituent elements of the manure, if they are supplied *alone*, have that great defect, that by them the soil is impoverished in other equally important elements. No *one* of itself can maintain the fertility. Keeping this in view, we may easily judge of the comparative value of artificial and natural manures, and all the various *arcana* which have been praised as *panaceas* for exhausted soils.

It is not less easy to understand why the farmers have such different opinions on the relative value of the constituents of manures—why one whose farm is rich in phosphates, produces an uncommon fertility by the application of nitrate of soda, or the supply of alkalies, while another does not see any favorable effect at all—why bones (phosphates of lime) produce in many fields wonders, and are not of the slightest benefit to others, which are deficient in alkalies or alkaline salts. From the composition of animal manures, it results with certainty, that by applying the latter, (solid and fluid excrements of men and animals) we supply to the soil not one but all the elements which have been taken away in the harvest. Fertility is perfectly restored to the field by a corresponding supply of this manure, and it may be increased by it to a certain limit. This will be the more intelligible, if we compare the mineral elements of the urine of horses and cattle with the mineral elements of herbs, straw, roots, &c., of our cultivated plants. It will be found that in their quality they are perfectly identical.

	Urine of a horse.	Of another.	Of oxen.
Carbonate of lime, - - -	12.50	31.00	1.07
" of magnesia, - -	9.46	13.07	6.93
" of potash, - -	46.09	40.33	77.28
" of soda, - - -	10.33		
Sulphate of potash, - -	13.04	9.02	13.30
Chloride of sodium, - - -	0.55	——	0.30

These salts in the urine of horses amount to nearly four per cent; in that of oxen to 2½ per cent. of their weights. If we compare the composition of these different sorts of urine with the composition of the straw of peas, beans, and potatoes, if clover and hay, it will at

once be obvious, that in stable dung we replace by the urine, the alkaline carbonates which we have removed in harvest. What in this urine, is wanting in phosphates and carbonate of lime and phosphate of magnesia, forms the principal constituent elements of the solid excrements of animals; *both together* (solid excrements and urine) restore the field to its original composition, and thus a new generation of cultivated plants meet with the mineral ingredients necessary for their development. If we farther compare the guano and the fæces of men with the composition of the animal urine, the analysis shows (rf. my book on agriculture) that both are entirely defective in *alkaline carbonates*—they contain phosphates and sulphates as well as chloride of sodium; but no free alkali—they contain phosphate of lime and phosphate of magnesia, in short their elements are in *quality* identical with the important mineral elements of the seeds of wheat, peas, beans, (rf. the analysis.) The urine of swine is in its composition intermediate between the urine of man horses.

Analysis of the urine of swine.

Carbonate of potash, - - -	12.1	The solid excrements of swine contain principally phosphate of lime.
Phosphate of soda, - - - - -	19.0	
Sulphate of soda, - - - - -	7.0	
Chloride of sodium, - - -	53.1	
" of potassium, -		
Phosphate of lime, - - -	8.8	
" of magnesia, -		
Traces of iron, - - - - -		

What the practical results of a knowledge of the composition of these manures are, is clear. If it were possible to provide our fields with the dung of swine in sufficient quantity, we would replace by it, in a soil which contains *silica* and *lime*, all the remaining elements of the plants—the field might be made fertile for all kinds of plants —we have in it not only alkaline phosphates, the principal elements of the seeds, but also alkaline carbonates, which are required by the leaves, stalks, and roots. This purpose cannot be attained, however, by manuring with guano or human excrements alone, but perfectly so by stable manure, from its containing alkaline carbonates. If I have said that stable manure contains the mineral elements of the nurture of the plants, exactly in a state and condition in which they are furnished by nature—that a field manured by it resembles the primitive state of America and Hungary, this assertion will not be found exaggerated. It is certain that stable dung contains no alkaline phosphates, but nature does not furnish to the plants these elements even in the most fertile soil, although we find them in large quantity in all the seeds of wild plants. It is obvious, notwithstanding their absence from the soil, that the phosphates are formed in the organism of the plants, and that they originate from the phosphate of lime and magnesia and the supplied alkalies, by an exchange

of the elements of both. The alkalies are necessary for forming *alkaline phosphates*, which cannot originate in the phosphate of lime alone. Both together are present in stable dung. In human excrements, and in guano, the alkaline carbonates are entirely wanting. The practice of the farmer, in some places, of supplying to the field not pure guano, but a mixture of it with gypsum, shows clearly that the phosphates of alkaline bases are really formed in the organism of the plants from the phosphate of lime and magnesia, because this mixture (guano and gypsum) contains less phosphate of potash or soda than the guano itself; or, in certain proportions of gypsum, no alkaline phosphates at all; the soluble phosphates in the guano decomposing the gypsum into phosphate of lime and magnesia, and into sulphate of potash. I am far from asserting that we should not provide the fields with alkaline phosphates; the excellent effect of the guano, and of the human excrements, is too well known to question it, and we perceive, from this fact, that plants are in this respect like domestic animals which with a normal food, are healthy and strong, but do not fatten. On the contrary, we know that if we prepare the food of these animals artificially, so as to render it more easily digested and assimilated, they are enabled to consume, in a given time, a greater quantity of it by which all their parts increase in weight. The same happens with plants if we give them their nourishment in a state most appropriated for assimilation; their capability to attract the other elements from the atmosphere increases and their development is accelerated. If we recollect that the favorable effect of guano upon our fields depends on its amount of *ammoniacal salts*, of *alkaline phosphates*, and the *other mineral constituents* of the seeds, but that it is defective in *alkalies*, the principal elements of the *herbs*, *straw*, and *roots*, it is easily understood why the opinions of farmers, on the value of guano as a manure are so very different. On a soil, which is defective in alkalies, its effect is small, on a soil rich in them, it increases the produce in a remarkable degree; but, as I have already observed, the continued application of guano must gradually diminish the fertility of our fields for a number of plants, because the elements of those organs, of the leaves, stalks, roots, &c., without which the plants cannot be developed and cannot produce seeds, are taken off in the harvest without any restoration of them. I think it, therefore, certain, that the stable dung can replace the guano to a certain degree, but not *vice versa*. A rational agriculturist, in using guano, cannot dispense with stable dung.

A covering for those places in which stable dung is preserved, in order to shelter it from the effect of the rain, has been regarded in Germany as essential for preserving its manuring power. In consequence of the experience, that the soluble elements of stable dung are the most efficacious, it has in some cases, been drawn out with water, and it has been found advantageous to carry *only this fluid* to the fields, I need only refer to the foregoing analysis of the

urine of animals in order to see upon *which elements* of it this effect depends.

The reason why, in certain years, the influence of the best and most plentiful manuring is scarcely perceptible, is, that during the moist and rainy springs and summers, the *phosphates* and *and other salts with alkaline bases*, as also the *soluble ammoniacal salts* are entirely or partly removed. A great amount of rain and moisture removes in the greatest quantity, the very substances which are most indispensable to the plants at the time that they begin to form and mature seeds. The system of draining, which, of late has been so extensively followed in England, brings the land into the state of a great filter, through which the soluble alkalies are *drawn off*, in consequence of the percolation of rain; and it must, therefore, become more deficient in its *soluble* efficacious elements.

Attentive farmers must have observed that after a certain time the quality of the grain on land laid dry according to this principle, deteriorates; that the produce of grain bears no due proportion to the produce of straw.

What is more evident, sir, after these remarks, than that intelligent farmers must strive to give to the soil the manuring substances in such a state, as to render possible their acting favorably on the plants during the whole time of their growth. Art must find out the means of reducing the solubility of the manuring substances to a certain limit, in a word of bringing them into the same state, in which they exist in a most fertile virgin soil, and in which they can be best assimilated by the plants.

I am, sir, your obedient servant,
DR. JUSTUS LIEBIG.

Giessen, 1845.

CIRCULATION IN VEGETABLES.

The structure of plants is exceedingly simple and nearly alike in all the different classes, so far as they have been examined. The important part which serve to provide for their nourishment and growth, are the root, the stem and the leaves. These are all formed of a variety of vessels and tubes, in which the sap and other fluids circulate. The sap is in the first place taken into the roots, probably by means of the long fibrous filaments which are usually extended in every direction, and conveyed into what are called the central vessels. These are so called from their being arranged, in annual shoots, and herbaceous plants, around the pith or centre of the stem. They are constructed of fibres which are wound spirally around them, and are thence sometimes called the spiral vessels. This arrangement probably contributes to the motion of the fluids they contain. By these vessels the sap is carried up the stem and distributed to the different branches, and thence to the leaves, flow-

ers, or fruit. In the leaves it circulates and is there exposed to the influence of light, heat, and air, and is no doubt perfected and elaborated by the process which it undergoes. Returning from the leaves, it descends in a different set of vessels situated in the bark, and in its descent contributes to the growth and nourishment of the plant by depositing new layers of vegetable matter between the bark and the wood

This is the course of the circulation in annual plants, in which there is an entirely new growth every year from the root. But in trees or shrubs where the same trunk or stem continues from year to year, the arrangement, though essentially the same, is a little varied. The central vessels are not situated directly around the pith, but in the external layer of wood called the *alburnum*, which is always the growth of the preceding year, and performs this office only for one season, being afterwards surrounded and enclosed by a new layer of the same kind. Hence the trunks of trees are formed by layers of wood, which have been yearly deposited around the centre, and have successively afforded a passage for the sap, by means of the central or spiral vessels, to ascend into the branches and leaves. From the leaves the sap descends through the vessels of the internal layer of the bark, as in the former case, and in its descent gradually contributes to the formation of an alburnum for the next year. That part of the bark, also, that has once served the purposes of circulation, like the alburnum, is afterwards thrown aside, and its place is supplied by a new layer formed on its inside between it and the alburnum. Hence the large quantity of thick and dead bark which is often accumulated upon the outside of the trunk and branches of old trees.

This is a slight sketch of some of the most important points in the vegetable circulation. It appears from this, that the principal seat of the growth and nutrition of plants is in the bark and alburnum, and that all the new matter yearly added, is deposited on the outside of the latter and the inside of the former—that the growth of one year is only subservient to the circulation of the next, and is ever afterwards of use merely in giving strength and stability to the trunk, in order to support the increasing size and weight of the branches and leaves. The wisdom and beauty of this provision, by which that portion of the plant, which has become useless for every other purpose, is thus made to answer a very important end, are sufficiently obvious; and it is rendered necessary by the circumstance that plants do not, like animals, arrive at a definite size and there cease, but go on growing to an indefinite extent, and consequently require corresponding increase of strength in those parts which are to support them. [*Smellie.*

A pint of lime and a pint of salt, mixed with a pail of water, is said to preserve eggs for any reasonable time.

From the Genesee Farmer.

THE CULTURE OF INDIAN CORN.

The long evenings in winter are quite appropriate for young farmers, (and old ones too, if they are willing) to learn how to grow corn to the best possible advantage. There are but few cultivated plants,—we know of none grown in this State—which draw more largely from the atmosphere and water for their nourishment. Corn plants, however, have some earthy substances, which must be drawn exclusively from the soil.

In 100 lbs. of corn (maize) Dr. Dana, who is one of the best analytical chemists in the Union, finds 1.31—100 lbs of *ash*, or incumbustible mineral matter which is made up as follows:

Potash,	0.200
Soda,	0 250
Lime,	0.035
Magnesia,	0.128
Oxide of iron,	a trace
Silica (flint sand,)	0.434
Sulphuric acid,	0.017
Phosphoric acid,	0.224
Chlorine,	0.008
	1.31.2

In southern corn Professor Shepard of Charleston, S. C., finds only nine-tenths of a pound of ash in 100 lbs. of the grain.

Organically considered as an article of food, Dr. Dana thus divides this superior fat-forming seed:

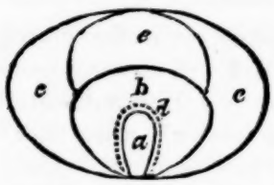
Starch, oil, sugar and zeine,	77.09
Nitrogenous matter, (albumen,)	12.60
Water,	9.00
Salts,	1.31
	100.00

The starch, oil, sugar and zeine, form fat alone; and are burnt to keep all gramivorus animals warm. These organized substances are made up of water—oxygen and hydrogen—and carbon exclusively. The flesh-forming organized matter in corn, has all the simple elements found in starch, oil, and sugar, with the addition of *nitrogen*, forming an elastic gluey substance called gluten, allumen, casiene, &c.

The following diagram and extract from the Editor's Report, to the Legislature at its last session, will serve to explain this subject more fully:

The organized arrangement of the phosphate of lime and magnesia, in an embryo corn plant, and the locality of the salts of iron,

zeine and starch, are worth knowing. The following diagram illustrates the section of a grain of corn:



a. The cotyledon or embryo.

b. Starch.

c. e. Oil—zeine—sugar.

d. Salts of iron.

In the cotyledon or germ, is deposited the phosphates which form the bones of animals, and also most of the glutinous substance which is indispensable in the formation of lean meat, tendon, tissue, and the jelly found in bones. Hence, when the mouse eats out the chit or kernel of corn, he gets the raw material to make muscle, bone, and brain; and by taking into its stomach the *iron* in the dotted line *d*. this little animal, as well as the ox and man, obtain the substance which gives color to the blood, and with oxygen, the vital heat of the system.

The iron in venous blood, is in a state of prot-oxide.* This fluid is loaded with carbon, if not carbonic acid. From these causes venous blood is much darker colored than arterial blood. In the latter the iron is a peroxide,* imparting to the blood a light vermillion hue. The fact has been demonstrated, that the air expelled from the lungs of a warm blooded animal contains 100 times more carbonic acid than the air taken into these organs. As the arteries leading from the heart penetrate every part of the living frame, they convey vital gas—oxygen, condensed in the per-oxide of iron—to every portion of the system. This oxygen, while the blood is passing through the tissues from the arteries into the veins, combines with that portion of carbon which has performed its office in nourishing the body, and carries it, in the form of carbonic acid, through the veins, heart and lungs, into the ever moving atmosphere.

In thus burning the waste carbon in the system, oxygen gives out just as much heat to the surrounding matter as it would, provided an equal quantity of vital gas had burnt an equal amount of fuel in a stove.

Every body knows that active exercise will warm him in cold weather—that a horse driven forty miles a day will breathe oftener, envolve more heat and consume more food, or fuel, than he will when standing quietly in a warm stable. The waste oxygen and hydrogen will escape from the lungs of the animal, if quiet, in the form of vapor; in perspiration also, if driven hard. This sweat will carry with it some nitrogen and saline matter, which sometimes crystalizes on a horse by the evaporation to dryness of the liquid

* "*Prot*-oxide" means the first oxide of iron, i. e., one part of oxygen gas united to one of metallic iron, as is witnessed in the scale that flies off from a heated bar, when hammered on an anvil in a blacksmith's shop. The "*per*-oxide," is the red rust of iron, having a larger portion of oxygen combined with the metal.

Copperas,—green vitriol—sulphate of iron—is a compound formed by the union of sulphuric acid (oil of vitriol) and the oxide of iron.

that escapes through his skin. But most of the valuable salts taken from the earth in the food of animals, escapes by the kidneys and bowels.

As the demand for carbon to form fat, muscle, cellular tissue, bone, brain, hair and wool, as well as to keep up a continuous heat of 98° night and day, is very great, it will be seen why *starch* is so abundant, not only in corn, as above indicated, but in all plants used as food for man or beast. Starch contains a large amount of carbon.

It is well known that if a bin of corn be moistened, it will heat and grow or rot. In the process of sprouting, a seed first imbibes some portion of the vital gas that surrounds it, which uniting with the carbon in the starch, forms carbonic acid and envolves heat. When starch thus loses one portion of its carbon, it is changed into a kind of *sugar*, making as is well known, sweet bread from wheat a lttle grown. If a grain of wheat be surrounded by a little waxy clay, only a half inch in diameter, it will not sprout, because oxygen gas cannot penetrate the compact earth. By sowing the grain in wet weather, so that the harrow covers the seed with mud, thousands of bushels are lost.

It is a matter of great practical importance to know how to develope a large, vigorous growth of roots. On a poor soil this can only be done by the aid of science. Deep ploughing and a thorough pulverizing of the soil are indispensable to accomplish this object.

From the Western Reserve Magazine.

SHEEP.

THE DIFFERENT BREEDS AND PRODUCTIVENESS THEREOF.

As our Legislature (Ohio) apparently have some inclination, after much soliciting, to aid the cause of the husbandman, and as the growing of sheep for the fleece is destined to become a matter of the first interest, we have judged that we could not present any thing that would be more appropriate to the time, than the following up of articles upon wool-growing.

To trace the entire history of wool, would occupy too much room for our pages. Suffice it then, that England has claims for growing the first fine wool, and for a number of years she alone grew the finest wool of any country. According to Macpherson's Annals of Commerce, the exportation of sheep from England was prohibited in 1338, but in 1348 she furnished sheep to Spain in exchange for horses, England then having the best breed of sheep, and Spain the best breed of horses in Europe. It has been generally claimed that Spain furnished, in earlier days, wool superior in fineness to that of any other nation, but it is known that Henry II, in his patent to the Weaver's Company, directs that "if any weaver mingled Spanish wool with English, it should be burned by the Lord Mayor." Previous to 1348, English wool was wrought in Flanders to such an

extent as to create the boast, according to Hallam, that "all the world was clothed from English wool wrought in Flanders." The narrow policy of the Netherlands drove the Flemish weavers to England; and under the liberal commercial views of Edward III, they became established in their new homes. From this period may be dated the prohibitory or protective system under which England has built up her immense interests in woollen manufactures. Of what is to be the policy of our government, in its future course, relative to the protection of woollen manufactures in the United States, it does not become us to hazard a thought, for whatever it may be, not a doubt can be entertained but that if it is profitable to grow wool at all, it is far the most profitable to grow the finest. Messrs. Perkins & Brown, of Arkon, O., have a large and valuable flock, we believe of Saxony sheep, and from a communication we have lately seen of theirs, *they* judge this to be the best breed. That they have received good prices for their wool is certainly evidence of its value, but whether the Saxony breed is superior to the Merino, will by many be questioned. Mr. Brown, we believe, has been east the past fall, making purchases from the most noted flocks of fine Saxon sheep, with a view to increase, if possible, the value of his whole flock, by which he both directly and indirectly adds value to the wool growing interests of the State, and should reap, as he doubtless will, his reward. In reply to a communication of Messrs. P. & B., published in an eastern paper, a Mr. Blakeslee, of Connecticut, takes up the cause of Merino sheep, in which he uses the following words, as indicative of purity of blood in the Merino sheep:

"I acknowledge that in pure blood Merino sheep there is native oil, which circulates through to the outer end of the wool, which keeps the wool always oily at the outer end—the consequence is, that whatever is gathered from the ground, or atmosphere, sticks on to the outside and forms a dark coat which preserves the health of the sheep, the life of the wool, and all its felting qualities, and this is the strongest testimony we can have of the purity of blood.

"I never saw an imported sheep from Spain, that did not have the native oil lodge on the surface. Experienced breeders of fine wooled sheep, when selecting males or females for breeding, take care to select those that have most of the native oil on the surface. I would here ask why fine wooled sheep have more of the native oil than the long wooled, and why all other kinds are free from it—it is self-evident that the native oil was designed from the beginning to preserve the felting properties in fine wool, because the long wools that are not designed for felting are almost entirely free from it.

"I am aware that after a long course of breeding *in and in*, or any other improper management, sheep will become degenerated, their constitution will be more delicate, and perhaps their wool may be a little finer, and less native oil, less strength, and less felting properties. It is the case in all flocks of sheep, that when a sheep

becomes unhealthy, the wool is finer, but is that sheep the most profitable one for the wool grower, or the best wool for the manufacturer?"

The following is from a report in the British American Cultivator, by which it will be seen that the Merinoes as a breed are most favorably noticed:

"Three Merinos may be kept upon the same feed, in equally as good condition, that would be required to keep two Leicesters; and in those districts where mutton bears only a small remunerating value, it would certainly be wise for such farmers to pay some little attention to improving the quality of the wool of their sheep. Merinos crossed upon the Leicesters improve the wool to a much greater degree than they decrease the value of the carcass; and by judicious crossings we see no reason why both objects cannot be obtained, and by the accomplishment of which, sheep-husbandry would become an important branch of Canadian husbandry. It is supposed by most of the farmers of this country that the Merino breed of sheep shear a light fleece, and will not endure a severe winter as well as the longer wooled breeds; these views, however, we have confidence in believing, will be changeed when they become better acquainted with this particular breed of sheep."

Mr. S. W. Jewett, of Weybridge, Vt. an extensive sheep breeder, in a communication to the Boston Cultivator, after remarking upon the value of the Leicester and of the Merino breed, has the following estimate to show that it is *profitable* to make the first outlay for one animal of an improved breed:

"Suppose you raise yearly 100 lambs, and you commence improving from a buck that will add one half pound of wool per head to each lamb of his get; now add together the *extra* wool yearly from each hundred got by this buck for five years.

100 lambs	all	one-half	fleeced	of extra wool	for 5 years	is 250 lbs.
100 "	"	"	"	" 4	"	" 200 lbs.
100 "	"	"	"	" 3	"	" 150 lbs.
100 "	"	"	"	" 2	"	" 100 lbs.
100 "	"	"	"	" 1	"	" 50 lbs.
						750 lbs.
			At 40 cents per lb.,	- -		40
						$300.00
			Cost of buck,	- - -		$25.00
						$275.00

It has been thought by many that a cross between the Merino and Leicester would result in increased size of carcass and improved quality of wool. Youatt, in Clater's "Every Man his own Cattle Doctor," has the following in reference to any such crosses:

"We repeat the warning, that by no skill in combination or any artificial mixture of bloods, need the farmer expect to get united the

fine fleece of the Saxony, the early maturity and obesity of the Leicester, the weight of the Lincolnshire or yet larger Cotswold, and the hardiness and fine mutton that give eminence to the South Down. There may yet be room to improve any particular breed of cattle or sheep, by that skill in the choice of breeding stock, and perfection in management, which care and ezperience only can beget; but we much doubt whether any new breed can be firmly established, that shall represent the excellencies without the defects of different natural races, and one that will, at the same time *endure*. All such made-up breeds, upon the least relaxation of attention, or the least mistake in sorting, with a view to breeding stock, will fly to pieces, and exhibit the defects with which *nature* is sure to reward the impertinent attempts of ignorance and presumption to interfere with her fundamental laws and purposes. A wayward dame is she, to be *consulted*, not thwarted; she will accept and repay all efforts of art to course out her design, and to improve her works according to her laws, and even leaves room for, and works the exercise of skill and diligence, but will not be crossed in her path, or permit things which she has ordained to be distinct, each with its nature adapted to peculiar circumstances and ends, to be mingled up with any hope of forming a new organization, better in all respects than she had designed. In England, the South Down sheep is infinitely improved in all that can give it value, except the grain and flavor of the mutton, which from time immemorial has been estimated superior; but *that* has been accomplished, not by mingling with it the blood of any other family, but by selection and care in breeding and feeding."

SUMMER MANAGEMENT OF SHEEP.

In a former number we noticed the admirable work, entitled, the "*American Shepherd*," by *L. A. Morrell*, and promised to recur to it again. This we do now with the more pleasure, as a subsequent re-perusal of the book has confirmed us in our former opinion, that, taken as a whole, it is the best one ever published for the uses and purposes of those of American sheep breeders, who may either be engaged in the business, or intend to embark in it. The very intelligent author has not only availed himself, in the compilation and writing of his work, of the lights reflected by European authors, but has done so with regard to some of the most extensive wool growers of America; thus laying before his readers a mass of the most invaluable information, so collected and arranged as to be presented in the most intelligible form. Superadded to these sources of information, he has thrown in the results of his own great experience. Thus, as it were, placing before the public eye, that which his judgment approves, and rejecting that which is not adapted to the habits and condition of the people of our own country. In

separating, as he has done, the chaff from the wheat, and retaining nothing but what can be rendered practically useful, *Mr. Morrell* has rendered a most acceptible service to the agricultural public, and entitled his book to a place in every farmer and planter's library.

In what we are about to *abstract* from the work we shall use *brevity*, contenting ourself with stating the *substance* of each chapter sufficiently clear, however, in our own language, to be understood.

Ed. Am. Far.

Change from dry to green food.—Sheep which may have been confined in yards or sheds upon hay or fodder, through the winter, should not be suddenly turned to grass in the spring; but it is better to suffer them to graze for an hour or two daily for a week first—during which period they should be fed during the residue of the day upon good hay and a small portion of grain. With those who have had regular supplies of roots, through the winter, the danger of turning them to grass in the spring is greatly reduced.

Separating the weak from the strong.—The weak should be separated from the strong sheep—the ewes about to yean, and the yearlings particularly require this attention, and should be put upon the best feed and pasture to bring them up in condition.

Tugging of sheep.—Before being turned to pasture in the spring, sheep should undergo the opearation of being tagged, which consists in clipping off the wool from about and below the dock and from between the thighs. This precaution avoids that accumulation of filth in these regions, and prevents the animal from being fly-blown, as it protects against soreness and ulceration.

Cutting horns and hoofs—At the time of tagging, should they require it, the horns of the sheep should be cut and their hoofs paired.

Drafting for the butcher.—Such sheep as may be intended to be sold to the butcher, should be selected in spring and put into the best pasture, in order that they may be put in good condition at the earliest period.

Lambing.—Time of parturation to the determined by climate and circumstances. In the northern and middle States, the month of May is considered the most eligible. Where houses are provided, an earlier period may answer.

Ewes in lamb should be disturbed as little as possible, and care paid to their food. Its quality should be good, and given in such *quantity* as to keep them in good condition *without* making them *fat*, as that state is injurious, and sometimes induces abortion. They should be kept during winter and early spring exempt from storms and cold.

Salting.—Attention must be paid to salting the sheep, and especially after being turned to pasture. The plentiful use of salt is found to be preventive of the liver-rot and scouring. Two quarts

to the 100 sheep, once a week, is stated as about the proper quantity. They may be either salted on the ground or in troughs.

Washing.—The operation of washing should not be performed until both the weather and water is comparatively warm—say about the 25th of May, till the 1st of June. A good day, when the sun shines brightly, should be selected—the time to commence from 10 o'clock A. M. to 12 o'clock, M. If any dung locks be upon the sheep, they should be cut off before the sheep is washed, and for this end, a sharp pair of shears should be at hand.

A running stream with gravelly bottom is perhaps the best and most economical place. Where there is no such stream at hand, Mr. Morrell recommends

A Vat, made of two inch pine plank, held together by three inch oak gripes. The one he uses is about 9 feet long, 4½ feet wide, and 3½ feet deep. The troughs which conduct the water to it are about 18 inches above the level of the top of the vat.

On one side of the vat is a permanent platform made of stone and floored with plank, the surface having a gentle inclination towards the vat, on which the sheep are held for a minute or more, after being washed, that the water may drain from the fleece.

Beside the vat (not in it) and upon the platform stands one of the washers, and a temporary staging on the opposite side accommodates another. One man is employed to bring the sheep from a small pound close at hand, and put them into the vat, in which two are held at a time by another at the lower end, for two or three minutes, with a view to soften the dirt. The washers then take them, and each holds one under the troughs or spouts, turning them in every position to receive the full benefit from the fall of the water, which proceeds with such force as to dislodge the dirt rapidly, and in a much briefer time than it can be done by squeezing. When the supply of water is full, no squeezing will be necessary, except, perhaps, the belly and thigh wool. As soon as the sheep held by the man for soaking pass from his hands to the washers, he is immediately supplied with others; and thus while two are soaking, two others are being washed under the spouts. One end of the vat being set a little below a level, the dirt passes freely off, and consequently the water is comparatively pure, the good effects of which will be seen in the almost cotton whiteness of the inner portion of the fleece. As to eradicating *all* the dirt from the external surface of wool when upon the sheep, it is not expected, for it is impossible to accomplish it; and therefore it must be left to the cleansing process of the manufacturer. *Soap* may be advantageously used in the process of washing.

After the sheep have been washed, they should be turned upon a thickly covered sward, that no dirt may collect on the fleeces before they are shorn. Driving along dusty roads after being washed must be avoided.

Castration and docking.—According to the size of the lamb and the weathar, these operations should be performed when the lambs

are from 5 to 20 days old—always in good mild weather, and early in the morning.

The lambs must be brought without hurry from the field. Confine them in a *small pound*, to prevent their being heated from exercise.

The following is the mode recommended, being the one practiced by the author for many years:

"One catches a lamb and seats himself astride a narrow plank or scantling, which is placed at an inclination of about 30 degrees, pressing the back of the lamb firmly against the belly, and with his hands grasps the hind legs, drawing them upwards and towards him, so that the *scrotum* is fairly exposed for the operation. The operator with a sharp knife cuts off about one-half to two thirds of the testicle bag; then drops his knife, and draws out one of the testicles at a time, till a portion of the connecting cord is seen, which he divides by the friction of his thumb and nail. This mode of division lacerates the cord, and less bleeding will follow than if done by a sharp instrument. It may, to some, appear unnecessary, and therefore objectionable, to cut off so much of the scrotum or bag; but if dislodged of its contents, it is certainly quite a useless affair, the little wool growing upon it being almost worthless, and a bother always to the tagger and shearer when cutting it off. No danger can arise, if the ointment, which will be presently spoken of, is used."

"After the testicles are removed, the operator grasps the tail of the lamb, and severs it about one inch from the root."

"The castration and docking being performed, use must be made of an ointment made as follows: To 1 quart of tar, add 2 lbs. of lard, warm them into a liquid and then add a gill of spirits of turpentine, and apply it to the *parts*, with a soft swab, and for one or two inches around them. This is very healthy in its effects, prevents inflammation from colds, and what is of most consequence, is an effectual guard against the attacks of the maggot fly."

"The lambs are put out of the pound as fast as each has passed the operation, and are disposed to be very quiet, which is quite right, as it checks the discharge of blood. Let them remain for an hour or more, if the pasture to which they are to be turned is distant, and then they may be moved off, but very slowly."

From the American Agriculturist.

TO GUARD SHEEP FROM BEING KILLED BY DOGS.

Perhaps one of the greatest obstacles to the keeping of sheep, has been the savage destruction made among them by worthless curs kept throughout our country, for no other reason, we could ever imagine, than to gratify the fancy of their owners. If these animals were kept constantly chained up where they could do no harm, no

fault would be found : but, when suffered to run at large and become public destroyers, it is quite another affair, and we hold every one justifiable, nay, positive duty on their parts, to shoot all dog prowlers without any more hesitation than they would a mad wolf.

The importation of the large Spanish shepherd dog has been recommended, as he will invariably attack and kill any dog that approaches his flock. But this would be an expensive measure, and it would take a long while to breed a sufficient number of them here, before they could become generally effectual. During our visit to Kentucky, we learned a very simple, and at the same time, profitable way of keeping sheep, which is this :

Put a few active cows, with their sucking calves, in the same pasture with the flock—five would probably be enough for several hundred sheep, to which add five active three year old steers, and as many more two year old. Take a gentle dog into the field, with a long light cord about his neck, the end held in the person's hand accompanying to keep him in check, and then set him on the sheep. The cows, thinking of their offspring, will immediately advance to head the dog and guard the calves, and the steers will follow their example, and the sheep retreat behind them. This continue a few times, till the steers are well broke in, when the cows can be taken away, and they will inevitably gore any dog to death that dare persist in attacking the flock. However brave a dog may be in other matters, the moment he attacks a sheep, he seems to be conscious of the ignomy of it ; and, as if conscience stricken, becomes a coward, and will run at the slightest approach from other animals.

When steers arrive at the age of four years, it is generally requisite to remove them to better pasture than is required for sheep for the purpose of fattening, or they are wanted for the yoke. But, just before this is done, add as many of two years old as you wish to remove of the older ones, and the three years old will soon break in the young ones, and so the system can be annually kept up as long as requisite.

For these guards, we would recommend a small active race of animals, with sharp horns, as they would more effectually gore and and toss a dog, and it will require a small active animal to support itself on feed that is generally as short as sheep pastures usually are. The hardy red cattle of New England would be admirable for this purpose, or indeed any active native animal. Those chosen from the hilly or mountainous districts would be required. We are told by hunters that, it is thus the wild buffalo protects himself, on the vast plains of the west, from the attacks of savage bands of wolves, and they not unfrequently afford protection to whole herds of deer. Mr. Hart, of Kentucky, defended the deer in his park by the elk, a single pair of which would be sufficient to guard hundreds of them, as they would run down the fiercest dog in a few minutes, and cut him in two by perhaps a single stroke of the sharp hoofs of their fore feet.

From the Boston Cultivator.

WHAT FOOD WILL PRODUCE THE MOST WOOL?

Peas, beans, vetches, &c., are useful for the purpose of enriching the blood, by furnishing it with large supplies of albumen, which is its principal constituent. It will be remembered that in the analyses of flesh and blood the relative proportions of their constituents are nearly identical; consequently, whatever food contains nitrogen, and the greatest amount of albumen, is best adapted to the development of flesh or muscle, and is therefore the most nutricious.—Wheat, rye, barley, and buckwheat, contain large quantites of albumen, especially the first two; while oats, it will have been seen, contain 10½ per cent. of its organic elements of albumen, and peas and beans no less than 29 per cent. What conclusion, then, is to be drawn from this? It is seen that the chemical composition of horns, hoofs, hair, *wool*, and even feathers, is substantially the same; their organic elements are coagulated albumen and gelatin, and their inorganic, silica, carbonate, and phosphate of lime, and the oxides of iron and manganese. Hence it will readily appear that that food given to the sheep which will supply the greatest proportion of albumen, in the same ratio will increase the wool secretions, and consequently be productive of the most wool, provided, however, they also hold in suitable combination the inorganic substances of wool, without which they assimilate mostly for the formation of flesh and fat. This may be exemplified thus—a soil may be highly productive of corn, as well as a few of the cereal grains: yet for the production of wheat it may lack the proper proportion of the phosphate and carbonate of lime, and consequently the berry will not only be deficient in quantity but quality.

The following table exhibts the results of the experiments of the distinguished agriculturist De Raumer, on the effects produced by an equal quantity of several substances in increasing the flesh, tallow, and wool of sheep:

	Increased the weight of the living animal. lbs.	Produced wool. lbs.	Produced tallow, lbs.
1000 lbs. potatoes, raw, with salt,	46½	6½	12¼
do. do. without salt,	44	6½	11½
do. mangel wurtzel, raw,	38½	5¼	6½
do. wheat,	155	13	59½
do. oats,	146	10	42½
do. barley,	139	11½	60
do. peas,	134	14½	41
do. rye, with salt,	133	14	35
do. do. without salt,	90	22½	43
do. meal, wet,	129	13⅓	17½
do. buckwheat,	120	10	33

These results are said to agree with those of De Dombale, and with those of a number of other agriculturists.

It will be perceived by the above table, that wheat produces the greatest increase in the flesh of the sheep, though but little greater than oats; that peas, wheat and rye, produce the greatest increase in wool; and that barley and wheat cause the greatest increase in tallow. That, as an average, grain generally gives about three times the increase in the flesh, that roots do when in equal weight; that grain produces about twice as much wool as is caused by an equal weight of roots, and several times the amount of tallow.

The legitimate conclusion from the foregoing is, that the flock-master, whose object is wool only, must rely on good hay and some straw, whose constituents are admirably adapted for the growth and perfection of wool, with a moderate allowance daily of ground peas and oats, and some potatoes as green food, for the greatest amount of wool; and those gross substances, oil-cake, corn-meal, and ruta-baga, may be turned over to the production of fat mutton.

From the Genesee Farmer.

THE FATTENING OF ANIMALS.

The art of fattening domestic animals is less studied and understood in this country, than almost any other branch of Agriculture. Our farmers will find it much to their interest to devote more attention to the whole operation of transforming grain, roots, hay and grass into *flesh* and *fat*, to the very best advantage. There is reason to expect that well fatted cattle, sheep and swine, might be raised and fitted for the shambles, and will pay a living profit to send by rail-road to the Atlantic cities and markets. To make money, however, at the business, one must be a master of the art of selecting and keeping the best animals of each kind. Skill in this matter must be acquired mainly by experience and close observation. Much however, can be gained by studying the carefully recorded results of the experience of others. These have led to the establishment of a few general principles in feeding, some of which we will name:

An animal while growing in size, is less inclined to take on fat than he will be after his bones, tendons and muscles have come to maturity. Yet, a young animal will extract more nourishment from his food, and elaborate more *flesh* from a given quantity of it, than an old animal, or one that is in the meridian of life. In France, where the science of fattening animals has been cultivated with great care, and accuracy of detail, it is found that fat beef can be cheapest made from cows and bullocks at the ages of seven and eight years. The delay in time, cost of keep, and interest on capital, are serious objections to these ages. Where cows give milk, and oxen work, and thus both pay their way, the system indicated may be rendered quite profitable.

The celebrated English breeder, Robert Bakewell, succeeded after many years of troublesome experiments in creating a race of

neat cattle sheep, which were remarkable for their disposition to take on fat. The fundamental principles established by him, after all his experience, are these: that smallness of bone, fineness of skin and a roundness of body, are the surest indications in cattle to form a good deal of fat for the provender consumed.

The most striking features of the *Dishley Breed*, so much a favorite with Backwell, were:

1st. The animal low on his legs.

2d. The backbone straight.

3d. The carcass rounding and almost cylindrical.

4th. The chest deep and large.

All experience confirms the clear deductions of physiology in regard to the importance of so tending and rearing all domestic animals, as to have them of a gentle, meek and quiet disposition. Such animals, are better milkers, and better to take on and *keep on* both flesh and fat, than others of a wild, running nature.

Boussingault remarks that "in fattening animals in winter, which in some countries is done almost exclusively on hay, an ox weighing 740 lbs., and consuming 40 lbs. of hay a day, will increase in weight about 2 pounds daily." This would be gaining only one pound of beef, live weight, for 20 lbs. of hay. In the Rhenish provinces M. Moll states that they allow 11 lbs. of hay to every hundred pounds of dead weight of the animal daily, and expect to gain equal to one-third of its weight in three or four months.

Mr. Stephenson at Alsace, in France, fed 18 bullocks 119 days, in three separate lots of six beasts each, on white turnips, beans, linseed cake, oats and potatoes. One lot consumed 49 7 lbs. of hay each, and gained just 2 lbs. per diem, or 247.5 in all. At the time these animals were put up, their average weight was 1115 lbs. Second lot weighed at the beginning of the experiment, an average of 1016 lbs.; consumed of hay per diem, 34.3 lbs.—gain in weight 1.9 lbs., or 231.6 lbs.

Third lot weighed at first an average of 794 lbs. each, consumed of hay 16 lbs. per diem, a day; and gained 0.9 of a pound, or 112.6 lbs. in 119 days.

An ox has been fattened on clover cut in blossom, and fed directly, consuming 100. lbs daily, and gaining 2 lbs. in live weight.—When looseness of the bowels is induced, a part of the green clover is cured and then fed, of course not omitting a fair seasoning of salt. Clover is better for milch cows than timothy grass, as many carefully conducted experiments have proved.

The blood of a fatted ox, weighing on his feet 1496 lbs., was 7.4 per cent. of the whole weight, or 110 lbs. The offal varies from 15 to 20 per cent. of the live weight—that is, counting hide and tallow as equal in value to the four quarters.

M. Dubois, an extensive feeder, has realized as the mean of many experiments, 16.9 lbs. gain in live weight for every 220 lbs. of hay consumed. From this we deduct 2.4 lbs. for offal, leaving the nett

gain of 14.5 lbs. of beef for every 220 lbs. of hay. This at 25 cents per 100 lbs., or $5 a ton, makes 14½ lbs. beef to cost 55 cents, or nearly 4 cents a pound.

It is important to know that, in all these French and Rhenish experiments, oats, turnips, oil cake, and the like, are reduced to their supposed equivalents in hay, as a kind of provender currency. According to the best judgment of the editor of this paper, these equivalents are far from being true and reliable in practice. In short, we do not credit the statement that it requires 20 lbs. of good hay or its equivalent in roots and meal to make one pound of live weight in a healthy bullock. If it does, then no man can make beef at less than $6 per 100 lbs., and live by it.

In Europe, the practice is general to keep animals, while fattening, in dark stables and well bedded, that they may sleep much of their time. Perfect regularity should be observed in the times of feeding, as cattle will expect their allowance, and fret if it be not before them. Nothing, which is left after a beast is through eating, should be allowed to remain in his feeding trough. No pains should be spared to save under shelter, and free from waste, all the liquid and solid manure of domestic animals, and especially that of fattening cattle and swine. One important object in feeding animals for the butcher should ever be to enrich one's land by the aid of the manure it furnishes. In France, Belgium, and Holland, the land to fatten a beast on, is estimated by the square yard. All its food is carried to the stable, and the manure taken back again with the utmost care. Both the urine and dung are diluted with water to about four or five times their natural bulk, and applied by a watering cart to the fields.

By this system, three times the quantity of food can be grown on a given area of land that will be where stock are allowed to run over it and trample down the tender grass, and drop their excretions in a concentrated form, and on a very small surface. As these excretions contain the precise things which form grass, a moments reflection will convince any one of the importance of applying them, not in *heaps*, nor in a form so concentrated as to *kill*, like the urine of a domestic animal, growing plants. Hence the great importance of diluting urine and spreading it with the dung evenly over the whole surface. All that have tried soiling cattle, and especially cows, giving milk, speak favorably of the results.

CURE FOR WOUNDS IN HORSES.

While writing I will give you the following recipe for a preparation to cure wounds in horses.

Take one gill of turpentine, two gills of whiskey, and one egg. Beat the egg well, and mix the three together. It should be applied with a feather or swab twice a day. It keeps a wound healthy, and prevents its healing too rapidly. J. S. C.

Trenton, N. J. [*Albany Cultivator.*

KIND AND QUANTITY OF ADDITIONAL FOOD REQUIRED BY A GROWING ANIMAL.

The young and growing animal requires also that its food should be adjusted to its peculiar wants. In infancy the muscles and bones increase rapidly in size when the food is of a proper kind. This food, therefore, should contain a large supply of the phosphates, from which bone is formed, and of gluten or fibrin, by which the muscles are enlarged. Some kinds of fodder contain a large proportion of these phosphates. Such are corn seeds in general, and the red clover among grasses. Some again contain more of the material of muscles. Such are beans and peas among our usually cultivated seeds, and tares and other leguminous plants among our green crops.

Hence the skilful feeder or rearer of stock can often select with judgment that kind of food which will specially supply that which the animal, on account of its age or rapid growth, specially requires —or which, with a view to some special object, he wishes his animal specially to lay on. Does he admire the fine bone of the Ayrshire breed?—he will try to stint it while young of that kind of food in which the phosphates abound. Does he wish to strengthen his stock, and to enlarge their bones?—he will supply the phosphates liberally while the animal is rapidly growing.

An interesting application of these principles is seen in the mode of feeding calves adopted in different districts. Where they are to be raised for fattening stock, to be sold to the butcher at two or three years old, they are well fed with good and abundant food from the first, that they may grow rapidly, attain a great size, and carry much flesh. If starved and stinted while young, they often fatten rapidly when put at last upon a generous diet, but they never attain to their full natural size and weight.

When they are reared for breeding stock or for milkers, similar care is taken of them in the best dairy countries from the first, though in some the allowance of milk is stinted, and substitutes for milk are early given to the young animals.

But it is in rearing calves for the butcher that the greatest skill in feeding is displayed, where long practice has made the farmers expert in this branch of husbandry. To the man who has a calf and a milk cow, the question is, how can I, in the locality in which I am placed, make the most money off my calf and milk? Had I better give my calf a little of the milk, and sell the remainder in the form of new milk—or had I better make butter and give the skimmed milk to my calves—or will the veal, if I give my calf all the milk, pay me a better price in the end? The results of many trials has shown, that in some districts the high price is obtained for well fed veal gives a greater profit than can be derived from the milk in any other way.

While the calf is very young—during the first two or three weeks —its bones and muscles chiefly grow. It requires the materials of

these, therefore, more than fat, and hence half the milk it gets, at first, may be skimmed, and a little bean meal may be mixed with it to add more of the casein or curd, out of which the muscles are to be formed. The costive effect of the bean meal must be guarded against by occasional medicine, if required.

In the next stage, more fat is necessary, and in the third week at latest, full milk, with all its cream, should be given, and more milk than the mother supplies, if the calf requires it. Or, instead of the cream, a less costly kind of fat may be used. Oil cake, finely crushed, or linseed meal, may supply at a cheap rate the fat which, in the form of cream, sells for so much money. And, instead of the additional milk, bean meal in larger quantity may be tried, and if cautiously and skilfully used, the best effects on the size of the calf and the firmness of the veal may be anticipated.

In the third, or fattening stage, the custom is, with the same quantity of milk, to give double its natural quantity of cream—that is, to supply in this way, the fat which the animal is chiefly wished to lay on. This cream may either be mixed directly with the mother's milk, or, what is better, the *afterings* of several cows may be given to the calf along with its food. For the expensive there might no doubt be substituted many cheaper kinds of fat which the young animal might be expected to appropriate as readily as it does the fat of the milk. Linseed meal is given with economy. Might not vegetable oils and even animal fats be made up into emulsions which the calf would readily swallow, and which would increase his weight at an equally low cost? A fat pease-soup has been found to keep a cow long in milk; might it not be made profitable also to a fattening calf?

The selection of articles of food which will specially increase the size of the bones in the growing animal, by supplying a large quantity of the phosphates, is at present limited in a considerable degree. The grain of wheat, barley, and oats is the source from which these phosphates are most certainly and abundantly supplied to the animals that feed upon them. But in many cases corn is too expensive a food, and those kinds of corn which contain the largest proportion of the phosphates supply only a comparatively small quantity in a given time to the growing animal. Why should not bone-dust or *bone-meal* be introduced as an article of general food for growing animals? There is no reason to believe that animals would dislike it—none that they would be unable to digest. With this kind of food at our command, we might hope to minister *directly* to the weak limbs of our growing stock, and at pleasure to provide the spare-boned animal with the materials out of which a limb of great strength might be built up.

Chemical analysis comes further to our aid in pointing out the kind of food we ought to give for the purpose of increasing this or that part of the animal body. Thus in regard to the same growth of bone, it appears that, while *linseed and other oil-cakes* are mainly used with the view of adding to the fat, some varieties are more

fitted at the same time to minister to the growth of bone than others are. Thus four varieties of oil-cake examined in my laboratory, contained respectively of earthy phosphates and of other organic matter in 100 lbs. the following quantities :

	Per centage of	
	Earthy phosphates.	Other inorganic matter.
British linseed cake,	2.86	2.86
Dutch do.	2.70	2.54
Poppy cake,	5.22	1.24
Dodder cake,	6.67	3.37

The numbers in the first column, opposite to poppy and dodder cake, show that these varieties of oil-cake contained a much larger proportion of the phosphates than the others did, and consequently that an equal weight of them would yield to growing stock more of those substances which are specially required to build up their increasing bones. [*Johnston's Agri. Chemistry.*

IMPROVED HORSE COLLAR.

Of all the economical contrivances which we have examined amongst the many thousands which have attracted our attention, we have seen nothing so perfect anywhere, as the improvement in horse collars invented and patented by our townsman, Mr. F. C. Curtis. The hame and collar instead of being separate, constitue one piece of harness. By singular skill the hame is formed of the proper shape, of one piece of tough white oak wood, and is left open at the top; the hame irons are attached to this in the usual way, and the leather portion, or the collar which bears against the horses neck is neatly fitted and nailed to the hame. It requires nothing but a strap to connect the ends over the horse's neck and it is complete. The great advantage of this "improved hame, and horse collar" is, that it is never out of repair. A hame string is never lost, and of course not requiring such a fixture in drawing, they never come loose, and by those persons who are accustomed to all the inconveniences of such accidents, the advantages of the new invention by Mr. Curtis will be appreciated.

We think them admirably adapted to plantations where the negligence of negroes, costs planters more in keeping up their farming harness in one year than a full set of these collars would cost. Mr. John Summer of Pomaria, has used them on his plantation for more than a year, and although they have been much improved since he procured those which he has, he gives them the highest commendations, not only for durability, but for convenience and economy. They are for sale at Hollister & Co., and at Mr. Levi Hawley's, Columbia.

[*Columbia, South-Carolinian.*

THE HORSE HOE OR CULVIVATOR PLOUGH.

We have received through our friend, Mr. George Vail, of Troy, New-York, one of these implements which was constructed and patented in 1842, by Mr. Barnabas Langdon, of that city, and put into extensive use after much labor and practical experiment bestowed upon it. It has always been the recipient of a premium, whenever exhibited. At the *State Fair* at Poughkeepsie in 1844, an *extra premium* was awarded to it, and a large number sold at the same time. This implement has worked itself into very extensive use, and has been thoroughly tested by many of our acquaintances, who are the most practical and experienced agriculturists in the river counties of New-York, and who all testify to its utility, and its superiority over any other implement in general use. It not only does its work in a superior manner, but in much less time and at one-half the expense of common implements, which are three important items in these times of general low prices in agricultural productions. We think it would answer the purpose in a more efficient manner than our sweep plough, for paring down cotton beds, and as an instrument for weeding and loosening the soil between the hills of corn, potatoes, peas, beans, and all the root crops. When weeding, half-hilling or splitting down corn-hills, the weed cutters are always to be used, which cuts up the weeds, loosens the soil to the hill, and by cross-ploughing, leaves little for the hand hoe to do. For hilling, the weed-cutters are to be taken off and the mould boards put on the same place, and fastened by the same bolt; they will throw a beautiful furrow each way, and by cross-ploughing will not require the hand hoe at all.

For digging potatoes this implement is unrivalled, and all that can be desired by the farmer; it may be used for that purpose, with either the mould boards or weed cutters, and should be drawn by a double team, and by directing the plough under the middle of the hill, just deep enough to raise the potatoes to the surface which it will do in a most expeditious and workmanlike manner, without bruising or cutting in the least.

The following is the testimony of C. N. Brement, Esq. "Among the many implements exhibited at the State Fair last fall, none seemed to attract attention more, or appeared to meet the views of the multitude better, than the " horse hoe or cultivator plough," exhibited by Mr. Barnabas Langdon, of Troy. It affords me great pleasure to have it in my power to speak of the merits of this implement from experience, having used one the past season in my corn. My corn ground was laid off in squares, planted in the corners, leaving the hills three feet apart, which enabled me to run the horse hoe both ways; the edges of the share being sharp cut up the weeds, which with the soil, passes over the cutters and leaves the soil very light and loose. The breadth of the share is sufficient for rows three feet apart, as it loosens and breaks the soil beyond the

reach of the share, and after passing through the cross both ways there is little left for the hand to do.

It is a very efficient implement, and I have the testimony of a number of farmers and gardeners who have used it, and all speak in the highest terms of it. I did not try it for digging my potatoes, as my crop was on a side hill, but those who did try it, say it exceeds anything of the kind which has been introduced for that purpose."

Dated, Three Hills Farm. [*Columbia, South-Carolinian.*

WEIGHT PROPELLED MILLS.

Sir :—I have just read in the Scientific American, a notice of the "improved churn," propelled by weight power. The application of this power to propel machinery, has certainly been overlooked by men of mechanical genius. The "fifty-six," descending, in the case of the old English Jack, turns the roaster, however, it may be loaded with meats. The length of time it continues to turn, in its descent to the bottom of the cellar, is generally known, and the slight tax it is on the time of the cook, or her labor to wind it up is equally familiar. Now, sir, the fact is, that the descending weight, known as a fifty-six, supplies the place, and saves the expense of employing, to effect this desirable object in cookery, a living being, who might be otherwise well employed, and almost without wear or tear. The vast weight that one person may readily raise to moderate height, by the aid of machinery, even with a common wheel, and balance wheel added, is palpable,—that this weight will give a powerful impulse in descending, is equally certain.

Without attempting to say what can or cannot be effected by this species of power, aided by ingenious machinery, I will fearlessly advance the opinion that, in consequence of the valuable uses in domestic economy to which it could be applied, it would be invaluable. It could be made a power, without wear or tear, the first being the only cost,—and not only save manual labor, but the time of those capable of labor.

To come more to the point, I will also advance the assertion that no convenience of mills at a distance, can equal that of having the grinding of much bread-stuff done in the kitchen or out-house, and under the management of the cook. I think the question may be fairly asked,—cannot all machinery, that can be propelled by the arms of one man, be moved effectually by weight power? We have now Pratt's smallest size corn grinding mill, that, with the aid of the balance wheel, is readily worked by one man—the cutting box, also, a small machine for cleaning rice and pounding; and also one for grinding hominy. Now, sir, all these machines have been rendered perfectly domestic, and can be introduced into the kitchen or out house of every family, and especially so at the South, and are of incalculable benefit and convenience, and if they could be

made to operate by a weight power, would certainly be much more valuable.

The horse power is valuable, but it is far from convenient for every family to own and keep a horse—it being a serious expense, and of uncertain existence. The weight is always there—eats nothing—nor is ever disabled from labor.

I really think, sir that this subject is worthy the attention of men of mechanical genius. Of one thing I am certain, that in the South the renumeration for bringing this power to operate effectually, would be splendid, and in a lucrative point of view, surpass all others. I never yet have seen a man that was not tired of going to mill—though not of eating good bread, hominy, or rice. It ought to be known that the South is generally so situated, as regards grinding of grain, &c., by water power, that going to mill is a severe tax on Southern planters, many of whom have a hundred mouths to fill with bread. Taking this into view, the value of some domestic flour establishment will be obvious. Corn is the general bread-stuff—and next is rice. They are perfectly aware of the horse powers that are in use, but there a horse, together with a driver, has to be supported, besides the cost of each; and such is the nature of their crops of staple articles, that every horse and man that can be raised, is loudly called for in the making and saving the crop; hence a horse power ceases to be a convenience in the South, as it is found to be in the North, when applied to merely domestic machinery.

I respectfully submit the foregoing to mechanical genius.

A SUBSCRIBER.

St. Stephens, Ala. Dec. 18, 1845. [*N. Y. Scientific American.*

KYANIZING TIMBER.

In the Rail-road Journal of the 13th of November, you published an interesting account of a successful experiment on the Taunton New Bedford rail-road, by which 17,000 spruce sills, kyanized in the summer of 1840, were found upon a careful inspection last summer, to have endured the five year's use and exposure without any evidence of decay or deterioration; "a single stick selected indiscriminately, being taken out of the truck, with a view to a critical examination. It was split open and presented as sound an appearance in every respect as new wood. The spike holes were sound, and the wood as elastic as the first day the spikes were driven.

Nor is the experience acquired on the Massachusetts railway all we have to rely on in a question of such vital interest to the prosperity of railroads; you will find that there has been at least one other equally successful experiment made in the State of Maryland, and of two years anterior date, as appears from the following notice, by the committee on publication, in the Journal of the Franklin Institute, Feb. 1844, page 99, viz:

"James Heron, civil engineer, has deposited in the hall of the Franklin Institute, a section of a kyanized chesnut sleeper from the Baltimore and Susquehanna rail-road, which was prepared in July 1838, laid in August of the same year, and taken up for the purpose of examination in August 1843, having been in actual service for five years, as is attested by Robert S. Hollins, secretary for the company.

"This interesting section, which may be seen at the hall, is in a perfect state of preservation, and it is stated by the officers of the company, that all the kyanized sills are, without a single exception, as sound as the specimen referred to, while the unprepared sleepers of the same lot of timber have all decayed." [*N. Y. Far. & Mec.*

CHARRING VEGETABLE REFUSE.

The great advantage of employing refuse which has been submitted to this process, in the cultivation of plants, is now pretty well known. A simple way of charring the vegetable refuse of a garden, is this:—Take a few dry faggots, mixed with dry straw, and set up for a centre; around these, build up the rubbish, placing the chippings of wood, &c., next the faggots, and the greener parts, together with tree prunings, near the outside. Around this, build with sawdust, or green turf, leaving an avenue for lighting the fire. When properly lighted, the hole at the top is closed by degrees, the holes are made lower down the heap, which are in their turn closed up, as the fire draws down, and this is continued to the bottom of the heap. When all is charred, the holes may be all stopped, and additional covering laid on, to prevent entirely the access of air. In a few days the heap may be opened, and the material will be ready for use; the larger parts for draining flower-pots; the smaller for applying on the ground. [*N. Y. Far. & Mec.*

QUERIES.

Will some of our practical agriculturists, or rice-planters, inform us, what are the most efficient applications to be made to rice-lands to *prevent* the lodging of the grain before it is fully ripe?

On clay-lands this does not often happen, but on fat loams it is often a serious grievance. Thick planting has been tried, and applications of lime have been made with but partial success.

Will some experienced planter show a better way of treatment, and oblige more than one SUFFERER.

THOS. WARING, *Auditor.*

Abstract for 1845, of the Thermometer, Barometer, Dew Point, Winds and Weather, at Charleston.

Months.	Barometer.			Thermometer Attached.			Days.	Days.	Thermometer Detached.									Register Thermometer.				Dew Point
									Max'm.			Mini'm.			Mean Tem'ture.			Mean Tem.		High Deg.	Low Deg.	
	Max.	Min.	Range	Mean 7 A.M.	Mean 2 P.M.	Mean 9 P.M.	Hottest	Coldest	7A.M.	2P.M.	9P.M.	7A.M.	2P.M.	9P.M.	7A.M.	2P.M.	9P.M.	DAY.	NIGHT	DAY.	NIGHT	MEAN
January, -	30.47	29.80	0.67	50.51	58 93	54.21	17	31	64	68	67	35	42	42	48.61	54.37	52 41	57 96	47.32	67	36	44.41
February,	30.50	29 60	0 90	49.57	58.25	53.92	23	5	64	73	64	31	41	39	43 89	58.28	52 96	59 60	46.53	71	32	42.07
March, -	30.58	29 74	0.84	55.35	63.45	59.77	31	20	66	78	69	40	54	47	53.64	64.32	59 03	64.12	51.32	76	40	47.41
April, - -	30.45	30.00	0 45	65.80	72.86	68.50	18	9	72	85	75	43	54	52	64.46	75.26	67.46	75.60	62.80	85	41	57.70
May, - -	30.50	29.80	0.70	67.97	75.03	69.77	5	16	74	80	74	53	57	55	67.35	73.45	69.41	77.66	66.58	85	50	62.93
June, - -	30.45	29.94	0.51	74.03	85.00	78.86	23	1	81	94	84	62	70	65	75.00	84 03	73 46	86 86	74.30	96	63	69.46
July, - -	30.36	29 92	0 44	74.00	82.25	82 49	22	1	81	92	86	72	75	75	77.42	83.80	79.39	86.54	74 25	93	69	72 77
August, -	30.34	30 02	0.32	77.32	83.00	79.67	15	3	80	89	84	65	68	67	74.48	80 74	76.67	83 66	73.22	91	65	71.96
September,	30.33	29.81	0.52	73.70	80.50	76 60	5	25	79	88	82	56	68	62	71.20	79.06	73.30	80.50	68.40	90	55	66.10
October, -	30.50	29 75	0.75	62.93	69.90	66.54	10	22	76	82	76	43	54	51	59.61	68.70	63 03	69.67	55.38	84	43	54.61
November,	30.45	29.74	0 41	52.70	61.16	56.26	1	28	68	76	68	38	44	41	49.40	60.50	54.33	61.63	46 50	75	36	41 00
December,	30.54	29 50	1.04	41.93	47 89	44.64	9	21	58	62	59	20	30	25	40.16	45.54	41 19	47 96	36.93	62	20	32.26

Months.	Course of Winds at Sunrise.								Prevailing.	Course of Winds at 4 P. M.								Prevailing.	Weather.				
	N.	N. E.	N. W.	E.	S.	S. E.	S. W.	W.		N.	N. E.	N. W.	E.	S.	S. E.	S. W.	W.		F.	C.	R.	Prevailing.	Quantity Rain.
January, - -	1	6	11	2	0	0	10	1	N W	2	3	8	5	0	0	8	5	S W	25	2	4	Fair	3.65
February, - -	1	5	10	2	0	3	7	0	do	0	7	6	3	1	2	7	2	N E	21	4	3	do	1.20
March, - -	3	9	4	1	0	4	10	0	S W	2	7	3	1	4	4	5	5	do	20	3	8	do	2.72
April, - -	1	4	4	2	0	2	14	3	do	0	1	2	7	1	2	15	2	S W	25	1	4	do	0.10
May, - - -	2	3	4	4	2	6	9	1	do	1	1	2	6	3	6	11	1	do	17	7	7	do	7.62
June, - - -	1	0	2	2	5	4	14	2	do	0	0	2	2	7	5	13	1	do	22	3	5	do	1.69
July, - - -	1	6	1	3	2	3	14	1	do	0	2	0	2	3	8	16	0	do	15	3	13	Rain	8.02
August, - -	4	9	1	1	1	2	12	1	do	3	4	1	4	2	4	11	2	do	16	5	10	Fair	9.42
September, - -	6	10	1	3	1	1	7	1	N E	2	10	1	7	1	3	5	1	N E	21	5	4	do	2.27
October, - -	3	19	2	1	1	3	2	0	do	2	17	2	3	2	3	1	1	do	16	6	9	do	5.51
November, - -	1	4	11	0	1	2	8	3	N W	3	3	17	0	0	2	12	3	S W	17	7	6	do	0.62
December, - -	0	7	14	0	0	0	5	5	do	0	8	4	0	0	1	5	3	N W	15	5	11	Rain	3.62

JOHN L. DAWSON, M. D.,
City Register.

Deaths within the City from 1st Jan. 1845, to 1st Jan. 1846

Months.	Male Whites.	Fem. Whites.	Male Blacks.	Fem. Blacks.	Total.
January,	10	5	13	22	50
February,	10	9	9	11	39
March,	8	5	14	11	38
April,	16	17	12	17	62
May,	5	13	14	19	51
June,	14	17	10	17	58
July,	9	9	13	12	43
August,	11	13	13	13	50
September	7	12	14	12	45
October,	10	9	12	19	50
November,	7	4	11	11	33
December,	12	14	18	7	51

Male Whites, -	119
Female Whites, -	127
Male Blacks, -	153
Female Blacks, -	171
Total, - -	570
Natives, - -	494
Foreigners, -	53
From other States, -	21
Non-Residents, -	2
Total, - -	570
Population of Charleston,	29,963
Proportion of Deaths,	1 in 52.18

Statement of the number of Bales of Cotton received in Charleston by the Rail-Road, from 1st Jan. 1845 to 1st Jan. 1846.

	Hamburg.	Aiken.	Bl'kville.	Midway.	Br'chville.	Columbia.	Gadsden.	Lewisville	Orangeb'g.	Way H. B.	Way C. B.	Total.
January, - - -	6,756	88	545	246	80	7,099	536	178	26	153	438	16,145
February, - - -	15,777	157	630	227	180	18,537	962	374	200	220	586	37,849
March, - - -	17,164	141	317	129	61	14,985	533	562	64	89	170	34,215
April, - - -	16,053	88	250	127	90	8,713	433	173	297	61	38	26,323
May, - - -	9,428	10	49	78	—	3,066	27	32	27	10	00	12,727
June, - - -	7,715	8	72	2	82	1,806	146	1	28	00	282	10,142
July, - - -	7,757	49	10	14	8	1,321	23	38	00	00	15	9,235
August, - - -	2,298	0	13	14	2	664	362	24	00	8	1	3,386
September, - - -	3 653	5	51	151	80	2,529	231	150	21	33	243	7,147
October, - - -	7,396	107	353	351	105	4,362	955	820	111	73	973	15,606
November, - - -	8,129	77	439	226	71	4,112	640	276	143	107	582	14,802
December, - - -	5,202	53	351	199	43	2,585	596	321	94	126	510	10,080
Total, - -	107,328	783	3.080	1,764	802	69,779	5,444	2,949	1,011	880	3,837	197,657

Statement of the number of Packages and Pieces forwarded up on the Rail-Road from 1st January 1845 to 1st January 1846

In January,	3,884	Pieces and Packages from	25	Vessels.
February,	3,323	do. do.	13	"
March,	3,740	do. do.	27	"
April,	5,036	do. do.	27	"
May,	2,371	do. do.	28	"
June,	2,504	do. do.	25	"
July,	4,125	do. do.	31	"
August,	6,337	do. do.	26	"
September,	15,010	do. do.	33	"
October,	16,957	do. do.	46	"
November,	7,107	do. do.	41	"
December,	2,773	do. do.	39	"
	73,667	do. do.	361	"

Statement of articles received by the Rail-Road, and forwarded to other places, from 1st January 1845, to 1st January 1846.

6,974	Bales	Cotton.	111	Boxes. Mdze.
776	..	Yarn.	5	Casks ..
12	..	Rags.	24	Bbls. ..
1	..	Goods.	3	Kegs ..
21	..	Roots.	4	Bags ..
8	..	Wool.	6	Trunks ..
36	Bags	Roots.	2	Bundles ..
479	..	Feathers.	1	.. Scythes.
3	..	Furs.	12	.. Leather.
3	..	Wax.	3	Boxes Rifles.
2	Tierc.	Wax.	3	.. Indigo.
2	..	Copper.	1	.. Copper.
1	..	Mdze.		
3	Hhds.	..	8499	Packages.

THOS. WARING, *Auditor.*

Abstract for 1845, of the Thermometer, Barometer, Dew Point, Winds and Weather, at Charleston.

	Thermometer	Days.	Days.	Thermometer Detached.	Register Thermometer.	Deaths within the City from 1st Jan. 1845, to 1st Jan. 1846
January,						
February,						
March,						
April,						
May,						
June,						
July,						
August,						
September,						
October,						
November,						
December,						

LIST OF PAYMENTS.

Hon J J Evans, Society Hill,	1846	Mr Thomas Wilson, Georgetown,	1846
Col J J Moore, Stateburg,	1846	Maj Wm M Murray, Edisto,	1846
Dr M Waring, Black Oak,	1844, '45, '46	Dr J S Palmer, Pineville,	1844, '45, '46
Mr. Thos A Coffin,	1846	Dr A M Walker, Columbus, Geo	1846
Dr I M Campbell,	1846	Wm J W Walker, Mulberry Grove P. O. Geo.	1846
Mr. J R Valk,	1846		
Hon John Rivers,	1846		

TO OUR READERS.

We present our readers in this Number of our Journal, some reasons for the *promotion of domestic manufactures* among our planters and farmers, as communicated to the Newberry South-Carolina Agricultural Society, by a committee; to which we beg leave to draw their attention. Also an article on the manufacture of *cotton bagging*, which we hope will be acceptable.

The article in vindication of Bommer's Method of making manure, will be satisfactory to those acquainted with its merits.

We call their attention to the article on the culture of *Indian corn*, because we think it contains some valuable information.

As *Wool* is likely to be more in demand, we have inserted several articles on breeding and rearing *sheep*.

We hope the Number will be found valuable and acceptable to many who have not an opportunity to obtain information elsewhere.

TO OUR SUBSCRIBERS.

We shall continue to publish the names of those generous patrons, who pay us for the *Southern Agriculturist*, because we think they are supporting a work of public utility, and performing the part of patriots. In order to assist those at a distance who have not complied with our frequent calls, we insert a method by which we may get our dues through the Post-office. An order on the Postmaster in Charleston, will be thankfully received; the following is the form:

P. O.,———(Date.)

Sir,—Please pay the Publisher of the Southern Agriculturist, ——— dollars, it being the amount this day deposited by A. B. as subscription money for said paper.

(Signed,) C. D., *Postmaster.*

To the Postmaster at Charleston.

Next, a notice to the Postmaster on whom the order is drawn:—

P. O. ———, (Date.)

Sir,—Mr. A. B., has this day deposited in this office ——— dollars, which you will please pay the publisher of the Southern Agriculturist, on presentation of my order on you for the amount.

Respecfully, yours,

C. D., *Postmaster.*

To the Postmaster at Charleston.

This should be sent under frank to the Postmaster at Charleston, before the money can be drawn.